

nearly equal the joints in length, being little more than discs, and are somewhat less in diameter. They are striate, and from them spring the branches. These branches are very numerous, diverging in all directions subdichotomously, and making a tolerably thick bush. They are much thinner than the main stem, and they become gradually more slender upwards, the calcareous joints at the same time becoming longer. Occasionally two of the ultimate branchlets come into contact and are soldered together. Each branchlet bears at its apex a cell of a shape between campanulate and infundibuliform, the margin of which bears eight pairs of long, upright, spine-like spicula. There are also sessile cells at the sides of the ultimate branchlets, one at each interjoint. All the cells are of a pale brown colour. The pellicle covering the branchlets contains long spicula, which are for the most part large and fusiform, whilst the smaller ones are cylindrical, and all are brown and minutely tuberculated.

A single example of this Coral was obtained from a fisherman at Cama de Lobos, Madeira, and it is now in the British Museum. Its length, without the base, which is wanting, is 13 inches, and it is 7 inches across. The lower part of the main stem has a diameter of three-tenths of an inch, and its calcareous joints are about three-eighths of an inch in length. The branches are broken away from this part of the stem; but there are remains to show that some of the interjoints bore four branches, others only one. A cell, with its marginal spines, measures the fifth of an inch.

This coral seems to be nearly related to *Mopsea dichotoma*; but M. Milne-Edwards gives the Indian Ocean (with a mark of doubt) as the habitat of that species. Strange to say, that writer, in his work on Corals ('Histoire Naturelle des Coralliaires,' forming one of the 'Nouvelles Suites à Buffon'), is altogether silent as to the cells of *Mopsea*. Lamouroux says that the polypi (? cells) of *M. dichotoma* are mammiform on the higher, tuberculous on the middle, and superficial on the lower branches. This would ill accord with the Madeiran specimen. Little agreement can be made out between that specimen and the figures of Esper, "Pflanzenhiere," Isis, pl. 5, figs. 1-5.

November 25, 1862.

E. W. H. Holdsworth, Esq., F.Z.S., in the Chair.

The following extracts were read from a letter addressed to the Secretary by Dr. G. Bennett, F.Z.S., dated Sydney.

"For the last six months I have been making every effort to procure specimens of the *Didunculus*, alive or dead. It has been reported (which I cannot credit) that they are nearly extinct; but if, as has been mentioned, the Samoan Islanders keep them as pets, as

is the case with the Mooruk among the natives of New Britain, I do not consider they can have become so scarce. We have not a single skin of this bird in the Australian Museum. The first time I sent for them the captain expected to call at the Navigators' Islands, but did not do so. Just previous to receiving your letter I was attending a young man in the office of a merchant who owns vessels trading to the islands; and as he is going for change of air as supercargo of a brig to visit the Samoan group about the end of August, I have furnished him with the description of the bird, and I will now give him your drawing. He will also procure me some Samoan Pigeons; and I hope that the brig will return, and, if successful, in sufficient time to send all the birds to you by the next voyage of the 'La Hogue.'

"I am happy to inform you that Mr. Hill has a pair of Brush-Turkeys (*Talegalla*), male and female, for Mr. A. Denison, for your Society. We have also a female; and as the Acclimatization Society have made arrangements with a collector (who proceeds next month to the northern districts) to procure for us several pairs of these birds to keep and breed, I will at the same time secure another pair in case of your requiring another male bird. I propose sending them to London in pairs, as most birds like society and are more likely to survive the voyage when in pairs.

"I will now give you some notes on birds which may be of interest to you. I have just received by Capt. McLeod a rough-dried specimen of a *Megapodius*, found abundantly over the New Hebrides and other groups of islands of the Southern Pacific. My specimen was procured from the island of Nua Fou, where it is named 'Mallow' by the natives. It accords with the description of *M. freycineti*. The bird measures 14 inches from the tip of the beak to the end of the tail; the plumage is of an uniform blackish-brown colour, the mandibles, feet, and legs yellow. At Tanna they gave it the English name of 'Bush Fowl;' at Sandwich Island it was named Tarboosh. At the island of Nua Fou, Capt. McLeod says the bird lives in the scrubs in the centre of the island, about a large lagoon of brackish water, which has the appearance of an extinct crater; the birds lay their eggs on one side only of this lagoon, where the soil is composed of a sulphur-looking sand; the eggs are deposited from 1 to 2 feet beneath the surface. The locality frequented by these birds is, at this island, under the protection of the king or chief, and by his permission only can the birds or eggs be procured. The number of eggs deposited in the mounds varies, as the eggs are laid by different birds in succession; but as many as forty eggs are said to have been procured from one mound. At the other islands the birds visit the sandy beaches in retired localities near the sea about the months of September and October, and deposit their eggs in mounds of sand a short distance one from the other. Thus this bird has the habits of the Freshwater Tortoises, which scoop a pit in the sand near a river, deposit their eggs, and cover them up; when hatched, the young force their way out of the sand, and, guided by their instinct, make for the river. Mr. Dawson, who procured living birds from the Island of

Sava or Russell Island, which unfortunately died on the passage to Sydney, informs me that the female lays daily from two to four eggs, and that the female on board laid two eggs daily until the time of her death. The natives of the various islands inhabited by these birds collect these eggs for sale (for they are richer and more delicious than those of the fowl), in baskets of two dozen each. The eggs are sometimes found fresh and good when opened, whilst others contain partially-formed young in different stages, even to the full-fledged bird just ready to emerge from the shell into active life. This might be expected, considering the irregular intervals of time the eggs are laid. The eggs I have vary slightly in size, but are usually of a pale brownish-red colour, and measure, for the most part, 3 inches in length and $1\frac{3}{4}$ inch in breadth.

“Our pair of Mooruks are thriving well in the Botanic Gardens : we have placed them in a large grassed enclosure, 117 feet in length and 45 feet broad, interspersed with a few trees and a small circular pond of water about 2 feet deep, where they are very fond of bathing. There is a thatched shed in the centre for further shelter, if required ; and the whole is surrounded by a wire fence, 5 feet high. In this enclosure with the Mooruks are two native companions, an Emu and a sedate Jabiru. The latter is a very solitary, timid bird, always seen by himself. He moves with stately strides, and, if pursued, runs with great rapidity. When the Mooruks first arrived, they were placed with the Water-fowl, in an enclosure where there was a deep tank of water ; they are very fond of bathing (which, I also observe, obtains with the Emu), and one of them leaped, as usual, into the water ; but the sides being perpendicular and made of cut stone, it could not get readily out of it. Finding itself getting exhausted, it struggled against the edge of the tank, cut its face and severely injured the throat, laying open the pharynx, through the gaping wound of which the food passed ; this was stitched, and the bird soon got quite well. From the birds being nearly drowned several times, they were removed to the enclosure before mentioned, with a more shallow pond of water. Mr. Dawson (who has just returned from New Britain) brought another young bird, but, from some cause or other, it died a few days after its arrival. It is now in the Australian Museum. He says the natives pronounce the name of this bird as if written ‘Moorup.’ Fifteen eggs, brought by Mr. Dawson, that I have examined (of which he gave me two, and also a pair for the Australian Museum) differ considerably in size and colour. They have all been exposed more or less to the influence of heat and various atmospheric influences ; so that none are seen of the beautiful grass-green colour of the recently-laid eggs in the Zoological Gardens in the Regent’s Park. One was a small abortive egg, barely one-half of the natural size, but with similar markings. The birds are brought off for sale by the natives in every stage of growth, from the young chick to the full-grown bird, with its dark plumage, purple neck, and trilobed crest. The medium of purchase is pipes and tobacco.”

The following letter, addressed by Dr. Bennett to the 'Sydney Herald' of September 3rd, 1862, was also read to the meeting:—

“ Since the publication of my observations on the Toothed-billed Pigeon (*Didunculus strigirostris*) in the 'Sydney Herald' of August 19th, 1862, I have received a communication from the secretary of the Acclimatization Society of Victoria, enclosing some valuable notes given to them, respecting this rare and extraordinary bird, by the Rev. John B. Stair, of Broadmeadows, Victoria, who was formerly resident for some time at the Samoan or Navigator group of islands, considered the exclusive habitat of this singular bird. I have now selected those portions relating to the bird which are either new to science or will more fully add to its history, and complete, as far as possible, our knowledge of this nearly extinct bird. Mr. Stair says he has seen the *Didunculus*, and that it is named by the natives Manu Mea, or red bird, from the most predominant colour of its plumage being chocolate-red. It was formerly found in great numbers; and this assertion may excite some surprise that this remarkable form of bird should not have been seen and procured by the early navigators. Now, Mr. Stair observes, as I have for some time suspected, the bird is nearly, if not entirely, extinct. It feeds on plantains, and is partial to the fruit of the 'soi,' a species of *Dioscorea* or yam, a twining plant found abundant among the islands, and producing a fruit resembling a small potatoe. The habits of this bird, Mr. Stair observes, are exceedingly shy and timid. Like the Ground-Pigeons, it roosts on bushes or stumps of trees, and feeds on the ground. It also builds its nest in such situations. During the breeding-season both parents aid in the duty of incubation, and relieve each other with great regularity; and so intent are they when sitting on the eggs as to be easily captured. It was in this way two living specimens were obtained for Mr. Stair. They are also captured by the natives with bird-lime or springs, and shot with arrows—the sportsman concealing himself near an open space in which some quantity of the 'soi,' their favourite food, has been placed.

“ The first living bird obtained was accidentally killed; the second, when placed in confinement, at first became sullen and refused food, but soon became reconciled to captivity, and thrived well. The natives fed it upon boiled taro (the root of the *Caladium esculentum*) rolled into oblong pellets, in the same manner as they feed their pet Wood-Pigeons and Doves. On the departure of a friend for Sydney in 1843, Mr. Stair availed himself of the opportunity of sending the bird here, for the purpose of ascertaining if it was known, and, if so, with what genus it was to be classed, and whether it was a new species. Some natives on board the vessel paid great attention to it, and fed it carefully during the voyage, and it reached Sydney alive. His friend informed him that he could obtain no information respecting the bird, whether it was a new species or otherwise, but left it with some bird-stuffer; and Mr. Stair heard nothing more respecting it until his return to England in 1847 or 1848, when he mentioned the subject to Mr. G. R. Gray of the British Museum, who showed him a

drawing of the bird, and told him the subsequent history of the specimen he sent to Sydney.

“The power of wing of most of the pigeon tribe is very great, and it also obtains in this bird. It flies through the air with a loud noise, like our Top-knot Pigeon (*Lopholæmus antarcticus*), found in the Illawarra district, and many other of our Australian Pigeons; and Mr. Stair describes it when rising as making so great a noise with its wings, that, when heard at a distance, it resembles a rumbling of distant thunder, for which it may be mistaken. Mr. Stair concludes his remarks by observing that, when on the eve of departing for England in 1845, although he made every effort to procure more specimens of the bird, and offered what was then considered large rewards, he could not succeed in obtaining any more specimens. He considers they may perhaps yet be found at Savaii, the largest and most mountainous island of the group; but he does not think they at present exist on the island of Upolu.”

A communication was also read from Sir Robert Schomburgk, H.M. Consul-General for Siam, dated Bangkok, August 15th, stating that a male of the splendid Pheasant *Diardigallus crawfurdi* was still alive in his possession, and in excellent health; and giving the following description of the female bird, of which he also sent a Chinese drawing and some feathers:—

“Cere oblong, of a bright-red colour, such as it is in the male, set with short hair-like feathers of a blackish colour, disposed in rows following the cere in its outline; eye black, with a golden-coloured iris; bill horn-coloured. The crown of the head, and the short feathers under the chin, of a slate-colour, but otherwise a reddish brown is the prevailing colour; of such a tint is likewise the mantle, only somewhat darker, and the feathers are speckled with black; those of the throat and breast are lighter in tint, and frequently margined at their ends with white to the extent of 2 lines.

“Primaries and scapulars of a dark slate-colour, almost black, barred transversely at intervals with bands of white speckled with black. These bars do not possess regular outlines. The large or middle tail-feathers are marked in a similar manner; the lower or side tail-feathers are of a reddish brown.

“The thighs are clothed with dark-brown feathers; below the knee the feet are naked and of a bright red colour, similar to the cere. There is no trace of spurs upon the leg.

“I give the measurements taken from what I believe to be the oldest of the two hens in my possession:—

| | ft. | in. | tenths. |
|---|-----|-----|---------|
| Length from tip of bill to end of middle tail-feather | 1 | 6 | 0 |
| Height | 0 | 10 | 5 |
| Length of tail | 0 | 9 | 0 |
| — of legs | 0 | 7 | 4 |
| — from the foot or tarsus to thigh | 0 | 4 | 0 |

| | ft. | in. | tenths. |
|---|-----|-----|---------|
| Length of foot from the tip of the middle claw to that of the hind toe | 0 | 3 | 5 |
| ——— of the large or middle toe | 0 | 2 | 0 |
| ——— of wing from shoulder to end of largest primary quill | 0 | 10 | 0 |
| Depth of wing | 0 | 4 | 2 |
| Circumference over the crown of the head and round the region of the eyes | 0 | 5 | 0 |
| Length of cere | 0 | 2 | 0 |
| Depth | 0 | 1 | 0 |
| Length of bill | 0 | 1 | 2" |

Sir Robert Schomburgk added that Crawford's drawing of the male bird alluded to by Mr. Gould in his account of this bird in the 'Birds of Asia,' "although stiff, was otherwise good," and that the habitat of this Pheasant was now fully ascertained to be the Shan States to the east of Kieng-mai, at Muang Nan, Muang Phi, &c.

The following letter, addressed to the Secretary by Dr. J. Shortt, F.Z.S., dated Chingleput, 9th August, 1862, was read to the meeting:—

"SIR,—I have much pleasure in sending you a short account of the Viper *Daboia elegans* (*Vipera russellii*)—the Tamil name being 'Kunuadi Vyrien,' or 'Kuturee Pamhoo.'

"Since sending you the skin, with skull entire, I have succeeded in procuring several specimens, alive and dead, both here and on the Shervaroy Hills, during a recent stay there of two months. The largest specimen in my collection at present measures 5 feet in length, and 7 inches in circumference at the thickest part of its body. Its head is large, elongate, depressed, rounded on the sides, and covered with acutely and regularly-keeled scales; nostrils large, subsuperior, anterior, and in the centre of a ring-like shield, edged with a large scale above; eyes convex, pupil round; nasal shield smooth in front; superciliary shield narrow, elongate, and distinct in front; jaws weak, upper toothless, with large, slightly curved, double fangs; lower jaw toothed; tongue long and forked: colour brown, with three rows of oblong (in the young, circular or oval) white-edged brown spots; two brown spots on each side of the occiput, separated by a narrow, oblique, yellow temporal streak. Scuta 168, subcaudals 52.

"From the three rows of white-edged spots being linked to each other, it is commonly called the Chain Viper. The Tamil name of 'Kunuadi Vyrien' literally means Glass Viper; that of 'Kuturee Pamhoo,' Scissors Snake. This name it receives from having double fangs, which are invariably present, of equal length, if not on both, on one side at least: these the natives of Southern India fancy resemble a pair of scissors.

"It is very common in these parts, and also at an elevation of 4800 feet above the sea (Shervaroy Hills): at the latter place I procured two specimens; the largest measured $4\frac{1}{2}$, and the other,

which was young, was 1 foot in length. These reptiles are generally found under stones and in rocky places; frequently in the low country it is found in prickly-pear bushes (*Opuntia vulgaris*).

"In their habits they are extremely active for their size, and live on frogs, mice, birds, &c. On opening the Viper I procured on the Shervaroy Hills, I removed from its inside a *Mynah* (Indian Grackle), from a second in this place a field-rat, and from a third an immense toad was taken. These Vipers are readily killed by the slightest blow; on one occasion I had one caught alive by fixing a noose round its body, but raising it from the ground and suspending it by the noose for a few seconds killed it.

"The natives dread these snakes greatly, as their bite is said to prove rapidly fatal. Although they are common in this district, I have not heard of an instance of this occurring during a residence of five years at this place. Dr. A. Hunter, of our service, tells me that when he was Zillah Surgeon here, some years ago, a sepoy was bitten by one, and that the man's life was saved by his sucking out the wound. During my stay on the Shervaroy, the first specimen that was brought to me was immediately recognized by my friend B. A. Daly, Esq., a coffee-planter, who related the following circumstance that occurred to him a few years ago. Mr. Daly was out shooting with a few dogs (mongrel spaniels), when he came upon one of these Vipers, and the dogs having attacked the snake before he could kill it, three were bitten, one after the other; the first died almost instantly, the second in about two hours after, whilst it was being carried home, and the third lingered for nearly three months from emaciation, general debility, loss of appetite, &c., and eventually made a good recovery. This we can readily understand: the first dog bitten received the largest quantity of poison, whilst the second received less, and when it came to the third the supply was no doubt all but exhausted, and the rapidity with which the wounds must have been inflicted left no time for fresh poison to be secreted. This accounts for the ultimate recovery of the dog.

"In January last a lady at this place was returning from a walk with her child, followed by a bull-terrier puppy about six months old; her house was situated some distance from the gate, and the road on either side was covered with spear-grass. It was just dusk. The puppy suddenly darted in front and began to bark vociferously. Although the lady had seen nothing, she took alarm at the movements of the puppy, and called out to me as I happened to be passing by the gate at that moment. On going to see what was the matter, I found a large Viper coiled up in the centre of the road, and the puppy making a great noise from a respectful distance. The snake was closely coiled up, with the neck bent abruptly backwards, and the head fixed almost horizontally; it began to puff itself out something after the manner of the Puff-Adder, and hissed loudly, intently watching the movements of the dog, no doubt awaiting an opportunity to strike it, when I called the puppy away. The instant the puppy turned its head, the snake glided with the rapidity of lightning into the surrounding grass and disappeared. The next day it was killed

in the same garden, and brought to me; it measured 4 feet 6 inches in length.

“These Snakes were formerly designated ‘Cobra Manil’ by the Portuguese, in consequence of their bite proving as rapidly fatal as that of the Cobra. The word Manil is a corruption of the Tamil word Mannunippāmhoo, which literally means Earth-eating Snake, and is the name given by the natives to the *Uropeltis grandis*, commonly termed ‘Double-headed’ Snake, and which they believe lives entirely on earth, from its being frequently found underground.”

Mr. W. K. Parker read the following abstract of a Memoir on the Osteology of the genera *Pterocles*, *Syrrhaptes*, *Hemipodius*, and *Tinamus*, intended for publication in the Society’s ‘Transactions’:—

“The classification of the gallinaceous birds would be easy enough if it were not for certain outliers, which refuse to conform to that particular plan of structure with which we are all so familiar in that very convenient and natural type of the group—the Common Fowl.

“Agreeing with this bird in all essential respects are the genera *Phasianus*, *Polyplectron*, *Lophophorus*, *Tragopan*, *Pavo*, *Meleagris*, *Numida*, and many others, the species of which are in many instances creatures of unsurpassed beauty. This properly typical group has, amongst other characteristics, its species provided with a robust body, short rounded wings, and very strong legs; whilst the tarsi are naked, provided with one or two spurs, and having the generally small heel elevated above the anterior toes.

“Notwithstanding the more subdued style of colouring, and the rudimentary condition of the spur, the Red Partridge (*Perdix rubra*) ought to be placed with the Francolins in the typical group.

“Still further, if we are to be guided by the structure of the skeleton, and especially by that of the skull, the dwarfs of the family, the Quails (*Coturnix*), ought to stand in the same inner circle as the gigantic species, the Turkey and the Peacock.

“In a subtypical group all those forms ought to be placed, in which, besides the quiet style of colouring, we find feebler legs, often with the tarsi feathered, a more depressed pigeon-like form of the body, and a skull with thinner and more fibrous walls, combined with a much enlarged tympanic cavity. The spur is also obsolete.

“The Grey Partridge (*Perdix cinerea*) should be classed with this subfamily—the *Tetraonidæ*.

“This beautiful and valuable bird is, as is especially shown in the structure of its skull, much more nearly related to the Ptarmigans (*Lagopus*) than to *Perdix rubra*, with its very thick-walled cellular skull, small tympanic cavities, and rudimentary spur.

“There is a group of very majestic birds inhabiting the warmer parts of the New World, which differs so much from the *Gallinæ* proper and from the *Tetraonidæ*, that it must be considered to belong to an outer or aberrant place in the great gallinaceous family. I allude to the *Cracidæ*.

“These birds, less ornate indeed than their normal relations, are

nevertheless creatures of great interest, and of no little beauty, whether we consider their form or their mode of colouring.

“In this outer circle we place the Guans (*Penelope*), the Curasows (*Crax*), the genera *Ortalia*, *Opisthocomus*, and others.

“The mode in which the *Cracidæ* differ from their terrestrial typical congeners is highly interesting; but as the present paper is only intended to be an introductory outline, I shall not ‘bestow all my tediousness’ upon the Society by going into details now: suffice it to say that they appear to me to connect the *Gallinacæ* quite as much with the Plantain-eaters (*Musophagidæ*) as with the Pigeons.

“The habit, which has given the family-name *Rasores* to the Fowl tribe, curiously enough, does not attain its highest degree in the typical species, but is developed in certain subtypical genera which are found ranging from the Philippines through the islands of the Indian Archipelago to Australia: these birds are the Megapodes*.

“In the ‘Mound-maker’ we have a bird which, whilst marvelously like the Common Hen in gentleness of expression and neatness of contour, has also a most striking isomorphic resemblance to certain members of a very distantly related family, viz. the Gallinules.

“My acquaintance with the structure of *Talegalla* was made sixteen or seventeen years ago; for at that time I met with and made drawings of a precious skeleton of this bird in one of the drawers of the Museum of the Royal College of Surgeons; it has not, however, been noticed in the Catalogue.

“Being therefore well and safely possessed of the fact that the Brush Turkey (*Talegalla*) does not, in any *essential point of structure*, differ from the Common and Ocellated Turkeys (*Meleagris gallopavo* and *M. ocellata*), I was indeed surprised to find that, as late as last spring, Professor Owen had classed them with Cuvier’s *Macrodactyli*.

“In the report in the ‘Medical Times and Gazette’ of the fourth of Professor Owen’s Jermyn Street Lectures for this year, delivered on the 23rd of May, I find the classification which he has adopted, and in which the mound-making birds are placed between the Rail and the Screamer.

“As there are in the same system of classification several other instances of what appear to me, to say the least, very odd and confusing misplacements, I shall crave the liberty to point them out, and to make my own remarks upon them, especially as the position in nature of these birds is exactly what I have set myself to try and find out. It is in Professor Owen’s Second, Third, and Fourth Orders, viz. the ‘Grallatores,’ ‘Cursores,’ and ‘Rasores,’ that I find most to surprise and confuse me.

“The family *Macrodactyli*, of the Second Order, ‘Grallatores,’ according to this eminent author contains the ‘Coot, Crane, Rail, Megapode, Screamer,’ and ‘Jacana.’

“The next family, or the ‘Cultriostres,’ contains, we are told, the ‘Boat-bill, Adjutant, Heron, Ibis, Stork, Tantalus,’ and ‘Spoon-bill.’

* Gould (see Penny Cyclop., art. “Talegalla”).

"The third family, or 'Longirostres,' is said to be composed of such forms as the 'Gambet, Avocet, Snipe, Ruff, Turnstone, Curlew, Sandpiper,' and 'Godwit.'

"And the fourth, or the 'Pressirostres,' the 'Oyster-catcher, Thicknee, Plover, Lapwing, Bustard,' and 'Courser.'

"Then in his Third Order, the Cursores, Professor Owen places these genera, and in this succession, viz. :—

'*Apteryx*.

Didus, Pezophaps.

Ostrich, Emeu, Nandú.

Cassowary.

Notornis.

Dinornis, Palapteryx.'

"In the Order 4, 'Rasores,' he gives us two families, viz. the *Gallinacei* or *Clamatores*, and the *Columbacei* or *Gemitores*.

"The first of these is exemplified by the 'Pea-fowl, Partridge, Quail, Pheasant, Ganga, Grouse, Pintado, Tinamú, Turkey, Curassow,' and 'Guan.'

"The second is made to contain the 'Dove, Goura,' and 'Vinago.'

"First, as to the Macroductylous *Grallæ*, the Porphyriine *Notornis* is wanting; and, besides the Megapode, the Crane certainly has no business there, being (as its embryology reveals) a gigantic specialized aberrant of the Pressirostral family.

"As to the *Cultrirostres*, I feel pretty certain that the Spoonbill and the Ibis will have to be placed in the next family, the *Longirostres*, a group less specialized from the Plover type than the Cranes. If this should turn out to be the truth, the 'Pressirostres' and the 'Longirostres' must receive accessions at the expense of the 'Cultrirostres,' which family, however, possesses the *Balæniceps*, the Umbre, and the *Eurypyga*.

"With regard to the 'Cursores,' it seems to me much better to use the simple term *Struthionidæ*, and to let *Didus* and *Pezophaps* abide where Messrs. Strickland and Melville most appropriately placed them, viz. amongst the Ground-Pigeons; the *Notornis* being marched back again to its proper place, between *Tribonyx* and *Porphyrio**.

"I hope to console the lover of the struthious tribe by compensating him for the loss of the Dodo and the *Notornis* with the gain of what has hitherto been considered as a true gallinaceous genus: I refer to the Tinamou.

"The examples given of the gallinaceous genera in Professor Owen's classification are principally remarkable for want of order, as the Ganga is not intermediate between the Pheasant and the Grouse, but between the Grouse and the Pigeon, and the Tinamou certainly has no place between the Pintado and the Turkey.

* Dr. Mantell (Petrifactions and their Teachings, page 125) says that "the general form of the skull" of *Notornis mantelli* "approaches nearest that of *Brachypteryx*;" whereas that of *Tribonyx mortieri* (Osteol. Catal. Mus. Coll. Chir. vol. i. p. 239, No. 1281) comes nearer. In the sternum, however, *Notornis* is most like *Brachypteryx*.

“The Gemitores might stand as they are, as to the examples given; but they are not *Rasores*.

“In the same lecture in which the ‘classification’ is given, the *Notornis* is said to be ‘allied to the Coots,’ and the Cassowaries ‘still more modified Coots.’

“This seems to me to be an inversion of the natural order of things; for the Cassowary, every one knows, is in all respects typically struthious in its whole skeleton, but is most decisively seen to be so in its cranium and facial bones; and all the *Struthiones* are low, embryonic, unspecialized forms.

“That there is a near relationship between the Rail-tribe and the Ostriches I feel certain; but the former seem to me to stand on the same level typically (or in relation to the highest style of bird) as the Rasorial group, and in some respects on a higher one; but I would not press this too far, as the skulking habits of these birds seem to point to a lower brain-development than even the Fowl possesses, and to place them in near contiguity to the Ostriches: moreover *Brachypteryx* is, in respect of its wings and sternum, but little in advance of the great ‘*Brevipennes*.’ Cranially, however, it is in advance; and it seems to be a more philosophical way of putting the matter to say that a Coot is a modified Cassowary, than that a Cassowary is a modified Coot. Whether Mr. Darwin is right in all respects or not, yet we all believe with him that nature does not retrograde, but ascends from the simpler to the more highly specialized forms.

“I shall not take up either the Society’s time or my own in merely arguing about these puzzling affinities, but hope soon to be able to bring forward some simple drawings and descriptions, such as shall enable any one to judge for himself as to what type these birds really do belong.

“I intend moreover in my larger paper to consider the relationships of *Oreophasis derbianus*.

“But the birds hitherto mentioned are all easily referred to their proper zoological position; those, however, of which it is my principal business to speak stand just above the *Struthionidæ*, in such a doubtful position that it is at first hard to say whether they have declared for any one of the families by which they are surrounded.

“The Sand-Grouse, the Hemipodes, and the Tinamous have in their composition such a mixture of characters, that they seem to be the very birds which might in the lapse of ages, through climatal change, a different diet, ‘the struggle for existence,’ and ‘natural selection’ give rise to such divaricating and dissimilar types as the Pigeons, the Gallinaceous birds, and the Plovers.

“These last-mentioned families are those the characters of which the osculant forms under consideration most affect, with, let it be remembered, a more or less broad struthious basis.

“There are other genera, however, the osteology of which I long to know, viz. *Thinocorus*, *Attagis*, and *Chionis*.

“Speaking of these birds, Mr. Darwin, in his most pleasant ‘Journal’ (ch. 5, p. 94), makes the following remarks:—

“This small family of birds is one of those which, from its varied relations to other families, although at present offering only difficulties to the systematic naturalist, ultimately may assist in revealing the grand scheme, common to the present and past ages, on which organized beings have been created.”

“*Thinocorus rumicivorus* partakes, according to this excellent author, ‘of the characters, different as they are, of the Quail and the Snipe’ (ibid. p. 94).

“As to the *Attagis*, Mr. Darwin says (p. 94), ‘The two species of this genus are in almost every respect Ptarmigans in their habits;’ and of *Chionis alba*, that it ‘is an inhabitant of the Antarctic regions,’ that ‘it feeds on sea-weed and shells on the tidal rocks,’ and that, ‘although not web-footed, from some unaccountable habit, it is frequently met with far out at sea’ (ibid. p. 94).

“Will some lover of ornithology be on the look-out to procure something more than the *skins* of the birds of these three genera?*

“It would tend towards our knowledge of the meaning of these birds of mixed character and osculant relationship, if we knew how long each type has been on the planet; for if our Fowls and Peacocks, Doves and Gouras, are really comparatively new importations to the ‘green earth,’ then there would be some colour and life in ‘Darwinism,’ and the Ostriches, Tinamous, and Sand-Grouse might be looked upon as a remnant of the ‘flint-folk’ of the bird-class.

“It is, however, almost impossible for the most devout believer in separate creations to keep this idea of ‘ancestral relationship’ altogether out of his mind when considering such birds as those we are speaking of: at any rate, dogmatism on either side, on a subject so far beyond the reach of our feeble faculties and limited knowledge, has in it something of profanity. I have, up to this time, only been able to get a sight of the skeletons of *Pterocles arenarius* (see Osteol. Cat. Mus. Coll. Chir. vol. i. p. 273, No. 1421), of *Hemipodius varius* (ibid. p. 274, No. 1423), of a specimen of an undetermined species of *Hemipodius* (which died soon after its arrival at the Gardens, and was lent to me by Mr. Gerrard), and of a *Syrrhaptus paradoxus* and a *Tinamus robustus*, for which I am indebted to the Council of this Society.

“I shall now merely indicate the curious composition, so to speak, of these birds, and begin with that of the Sand-Grouse.

“These beautiful and gentle birds are seen at once to have in them something both of the Ptarmigan and the Pigeon; but there is in their physiognomy a marked inferiority of expression, quite in contrast with the sharp, intelligent look of the typical Fowls, and very much below what we see in the Pigeon-tribe.

“This is exactly in harmony with what the skeleton reveals; for whilst the characters of both these types are almost inextricably interwoven, yet there is in many points a marked inferiority of character—a less degree of elevation above the Struthious style of structure. What there is of the Bustard (*Otis*) in them (which Pro-

* There is a skeleton of *Chionis*, I find, in the British Museum.

fessor Owen, 'Osteol. Catal.' p. 274, points out) is only part of their general relationship to the Pluvialine type.

"It is in those parts of the skull and face which are first mapped out in thickened blastema, and then differentiated into clear cartilage, at some considerable period of the early embryonic life anterior to the deposit of bone, that we find the most instructive modifications of structure.

"I allude especially to the basis cranii and to the upper part of the first facial arch, that is, to the occipital and sphenoidal regions, and to the pterygoids, palatine bones, and vomer. Not only do these bones (with the exception of the vomer, which is absent as in the Pigeons) show a marked 'struthious' inferiority in the *Syrnhaptēs* (the culmination of the Pterocline type of structure), but the sternum, which literally unites that of the Ptarmigan with its counterpart in the Pigeon, is inferior in one important point, not only to this, but also to that of the whole Pluvialine group.

"The heel, which is a mere rudiment in *Pterocles* proper, is absent in the *Syrnhaptēs*; and the whole pelvic extremity is almost the counterpart of that of the Swifts (*Cypselus*) in deficient growth. I believe that it would take a very clever anatomist to detect any difference between the wing-bones of the '*Pteroclinæ*' and those of a typical Pigeon.

"The elongated feathers of the tail and wings of *Syrnhaptēs* give it one of its peculiarities of character: the two middle tail-feathers have already become elongated in *Pterocles setarius* (the Pin-tailed Sand-Grouse of Temminck), its nearest ally.

"I cannot conclude this rough outline of what I wish to say about the Sand-Grouse, without referring to what Dr. Andrew Smith tells us of *Pterocles gutturalis*, Sm., in his 'Illustrations of the Zoology of South Africa.'

"First, what must be considered a 'Pluvialine' character, the eggs are of a 'dirty-white or cream-colour, marked with irregular streaks and blotches of a pale-rusty and pale-grey or ash-colour;' and the second point is the careless habit of laying them upon the bare ground*. This habit, so untypical ornithically, so unlike the almost human family tenderness of their relatives, the Pigeons, is, however, much like the conduct of the unthinking 'giants' that come next below them in the zoological scale.

"So that not only the Ostrich, but also the Sand-Grouse 'leaveth her eggs in the earth, and warmeth them in the dust, and forgetteth that the foot may crush them, or that the wild beast may break them.'

"If birds were intelligent in the human sense of the word, their relationship to the reptiles would be as humiliating as our affinity to the *Simiæ*; but the fact is certain that these low types not merely have in themselves obscure anatomical resemblances, but their instincts and habits are plain, out-spoken evidences of their nearness in nature to 'the creeping things after their kind.'

"I now leave *Syrnhaptēs* (which, at first sight, seems to run in

* Penny Cyclop., art. *Tetraonidæ*.

some mysterious way without the help of feet) to speak of the stilted *Hemipodius*, an aberrant gallinaceous bird, which has escaped from its more steady *walking* allies to join the true coursing birds. Without heel, with not only naked tarsi, but with the lower half of the tibiae bare; what can these birds be but true essential '*Grallæ*.'

"They may be in a sense grallatorial, but are not really so, as we shall see, if we work out their mixed affinities.

"The *Hemipodii* (some of which are very small, and, like some other small creatures, very pugnacious) stand pretty exactly between the Tinamous and the Quails; but not quite so, for the Pigeon comes in again, even here, with a touch of kinship, the connecting links being the *Didunculus* and the dwarf Ground-Pigeons (*Chamapelia*).

"The characters of head are almost equally divided between those of the Ground-Pigeon and the Quail; the sternum, between the Quail and Tinamou; yet the legs are those of a little Sand-Plover, although they are hinged upon a pelvis which would require but little altering to suit a Quail.

"I must ask for more time and space, if not to settle this difficulty, yet to put it into a proper form for some fuller mind to explain; for it seems to me that my position of 'interpreter' is in this case more perplexing than that of the purblind patriarch, who found the hands of his hairy son Esau combined with the vocal organs of the smooth-limbed Jacob.

"I have now merely to speak of the Tinamous; and in their case also I must merely indicate the kind of task they present to him who would fairly work them out.

"In the first place, let me at once say that they have no right to the dignity of the gallinaceous title; they are little struthious birds, looking upwards from that simple rudimentary beginning of the beautiful ornithic type.

"Nearly all the specialization of this bird, by which it rises above the *Struthionidæ*, is in the direction of the true or typical gallinaceous bird, and not towards the Ptarmigans, as is the case of the Sand-Grouse.

"The *Hemipodius* runs upwards towards the little flat-bodied typical Quails; but there is no bird better for comparison with the Tinamou than the common Hen. Nine-tenths of the characters of the bony structures of the head in this bird are truly struthious: the residuum belonging half to the Plover and half to the Fowl.

"It is not a little curious, however, that it outdoes the Plover in one thing, viz. the structure of the supraorbital region; for whilst the nasal or supraorbital glands in the *Pluvialinæ* are protected by a continuous beam of bone, the Tinamou has the unique character of a series of those bones. In the young Ring-Dottrel I find a series of square denticles growing out from the margin of the frontal below, and external to the large gland; these exogenous processes fuse together in the adult.

"I had racked my memory to find an instance of multiplied supraorbitals in a vertebrate skull, but in vain, when one turned up to me on examining the Reptilian skeletons in the Museum of the Col-

lege of Surgeons, a few months ago: this example is the skull of the Trigonal Cayman.

“There are three on each side in this latter creature, united by a triradiate suture; in the Tinamou, however, there are six or seven larger and several smaller ossicles on each side. At first sight it seems as though half the sclerotic ring had been attached there by accident; these supraorbitals are, however, much stronger than the sclerotals.

“The sternum of the Tinamou is greatly differentiated when compared with that of a Rhea or Emeu; but all the improvement is gallinaceous. It is absolutely the most unique and wonderful of all the sternums I have seen, the variations of which in the bird-class, as is well known, are very great and very exquisite.

“The presence of a somewhat deep keel, so seemingly fatal to the struthious theory of this bird's relationship, strange to say, turns out a good proof of its validity and truth. Every one who has watched the larger-winged Ostriches must have noticed their habit of lifting their wings—a motion performed by the middle pectoral muscles or *levator* of the humerus: to these muscles nearly all the keel of the Tinamou's sternum is devoted, a most narrow, small corner being left for the thin abortive *depressores*—muscles which, not only in typical birds, but also in the heavy Gallinaceæ, are of very large size. The small ‘furculum’ is Pluvialine; but the coracoids and scapulæ come very near to those of the common Fowl.

“The blending of the last cervical with three out of four of the dorsal vertebræ is gallinaceous; but the absence of costal appendages, except a small one on the second true rib and a trace on the third, is struthious enough. The pelvis looks, at first sight, but a few removes from that of the Hen; and in so much as it differs from the pelvis of the Emeu or the Apteryx (which have very compressed pelvis, whilst this is broad and gently arched), in the same degree does it approach that of the Fowl. The preacetabular spur of the ilium is there; but the postfemoral part of that bone looks as if it had been pared away, leaving an enormous ischiadic *notch*, which is a *foramen* in typical birds. The tail is a mere pretence (as Wagler's term *Nothura* well expresses); the caudal vertebræ are therefore but little better than those of an Ostrich. The strong legs leave us the choice, at first sight, of referring them to either the Fowl or the Ostrich; and the heel, small and high up, is gallinaceous. But the tarso-metatarsus, covered with transverse plates in front, has the posterior two-thirds invested by an intensely strong imbrication of horny scales; thus adapting the leg of the bird to that odd sitting position (about as elegant as that of the Ass in the first stage of the erect posture) in which the *Struthionidæ* delight.”